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## **The Effect of Mind Mapping on EFL Students' Idea Development in Argumentative Writing across Gender Differences and Learning Styles**

**Ary Setya Budhi Ningrum***STAIN Kediri, Jl. Sunan Ampel No.7 Ngronggo Kediri 64127**ary\_oyesip@yahoo.com***Mohammad Adnan Latief***Universitas Negeri Malang, Jl. Semarang 5 Malang 65145**a.adnanlatief@gmail.com***Gunadi Harry Sulistyo***Universitas Negeri Malang, Jl. Semarang 5 Malang 65145**emailgun.now@gmail.com*

### **Abstract**

The purpose of the study was to determine the impact of mind mapping as a strategy in generating ideas before writing on the EFL students' idea development in argumentative writing as perceived from their gender differences and learning styles. By conducting an experimental investigation at university level in Indonesia, two existing TOEFL classes at the State Islamic Studies (STAIN) in Kediri were selected by a lottery to group 1: using linear notes (N=41), and group 2: using mind mapping (N=41). For analyzing the data, Analysis of covariance (ANCOVA) were utilized by using students' TOEFL score as the covariate variable. The result findings indicated that there is no significant difference on the students' idea developments in writing between the control and the experimental groups. These result also revealed that there is no significant difference on the students' idea development in writing between gender differences, and among the students' learning styles. Furthermore, there is no significant interaction between treatment and gender differences, and there is no significant interaction between treatment and learning styles.

**Keywords:** mind mapping, gender differences, learning styles, argumentative writing

## A. Introduction

In the context of English as Foreign Language (EFL), it has been widely claimed by most Indonesian learners across different levels of education that writing is one of the most difficult skills to be developed. Hence it is not surprising that a lot of studies have investigated some efforts to help the learners develop their writing skill including this present study. Teaching writing in the context of English as a Foreign Language (EFL) is not an easy task. Moreover, it is believed that developing writing skills is more complicated than developing other language skills (Muth'im, 2010; Widiati & Cahyono, 2006; Richards, 1990). There are some reasons why writing is considered as a language skill which is difficult to be acquired by most of EFL learners. One of the reasons is that writing is not an automatic process (Langan, 2008), it is a complex process that needs a skill from at the moment a writer starts to thinking about what to write until the written text produced (Hartfiel, et al. 1985; Richards, 1990). In fact, learning to write well is a difficult and lengthy process that enables to induce anxiety and frustration in many learners (Richards, 1990). As a consequence, when there is a writing task from the teacher to write a particular topic, some of the students tend to procrastinate because they do not know what to begin and even sometimes they are frustrated because they cannot think of anything to say about a topic (Smalley, Ruetten, & Kozyrev, 2001). This point suggests that in the context of teaching and learning, the model of writing as a process is the most appropriate one (Raimes, 1983).

As a process, writing comprises some stages. In fact, different writers have different orderly sequence in writing a piece of composition. Different divisions of writing process proposed by some experts, in fact, show high similarities or it can be said that they share something in common. All of them proposed to have prewriting or planning before doing actual writing. Prewriting or planning is the initial and important step in the process of writing. The activities in the prewriting are designed to help students in preparing their writing by assisting them developing their background knowledge, selecting and narrowing appropriate topics, brainstorming ideas, and organizing thoughts.

One of the writing strategies presumed to be effective and useful in generating ideas is mind mapping. Mind mapping, invented and copyrighted by Buzan (2013), is a technique of representing information in a visual way by demonstrating connections among key concepts and ideas by utilizing lines, colors, characters, numbers, symbols, image, pictures or keywords, to associate, integrate and visualize the learned concept and evoke brain potential (Buzan & Buzan, 1993). Specifically, it is one of the effective techniques in promoting creative thinking and encouraging in generating and organizing ideas "brainstorming" for writing (Kirchner, 2009; Adam & Mowers, 2007).

Buzan & Buzan (1993) argued that compared with the standard 'linear' notes, mind mapping has over benefits. When compared to the linear notes in which the writer considerably relies on his left brain only when using it; the writer is able to maximize the full range of left and right sides of his brain potential when creating mind mapping. However, the grandeur of mind mapping has been a lack theoretically sound empirical work. There has been little research conducted to understand the advantage of mind mapping in generating ideas for writing. Thus, this study attempts to empirically investigate the impact of mind mapping comparing to standard linear notes into students' idea development in argumentative writing.

In the present study, we extend the line of the research exploring the effect of mind mapping as a writing strategy and also gender differences as well on the students' idea development in argumentative writing. Gender differences come into account as another variable contributed to this study as a response to the claim that mind mapping works based on the similar pattern how the human brain works. Meanwhile, recent evidence from the development of neuroscience reveals that men and women do in fact have differences in structures and function in the brain.

Several lines of evidence have appeared to confirm this issue. For example, there are differences in the structure of the male and female cerebral cortex (Rabinowicz et al., 2002). Brains are more asymmetric in men but not in women (Frederikse et al., 1999). The massa intermedia of the thalamus is, on average, 53% larger in the females despite the fact that male brains are on average 8% larger than the female brains (Allen & Gorski, 1991), and the parietal lobe—the part of the brain thought to be responsible for having association with perception of three dimension spatial, is larger 6% in men than women (Pasiak, 2002). These facts inspire the researchers to provide empirical data by conducting this current experimental study.

Meanwhile, concerning the notion of mind mapping as a “visual” presentation of students' thinking, there is a question that may appear. The question is “Is mind mapping benefited to just one a particular learning style such as visual learning style?” As a consequence, then we extend the line of the research exploring the effects of mind mapping, gender differences, and students' learning style as well in this study.

Learning styles constitute the way in which an individual learner acquires, retracts, and retrieves information to learn (Felder & Henriques, 1995). In accordance with learning styles, in fact, learning styles have been extensively discussed in the educational psychology literature (Claxton & Murrell, 1987; Schmeck, 1988) and specifically in the context of language learning by Oxford and her colleagues (Oxford & Ehrman, 1993; Wallace & Oxford, 1992).

There are many classification of learning style proposed by the experts such as cognitive style, perceptual style, and personality learning style (Reid, 1995), field dependence/independence (Witkin & Goodenough, 1981), left-brained and right-brained (Kane, 1984), sequential and random (Gregorc, 1982), the V-A-K (visual, auditory, kinesthetic) learning style by (DePorter et al., 1999). The V-A-K learning style by DePorter et al. (1999) is taken into account in this current study as it has a classification of visual learning style that is closely related with the question that may appear when talking about mind mapping as a “visual” device of students' process thinking. By knowing the students' learning style, the teacher can provide the suitable and appropriate strategy for their students. The strategy given will be matched to accommodate the students' needs.

Henceforth, in this current study the researcher expects that the result of this study enable to yield further information about the effects of using mind map, gender differences, and the students' learning style on the students' writing ability. With this regard, the study was designed to address the following questions as follows.

1. Is there any significant difference on the mean score of the idea development of students' argumentative writing between those using mind mapping and those using linear notes?

2. Is there any significant difference on the mean score of the idea development of students' argumentative writing between female and male students?
3. Are there any significant differences on the mean score of the idea development of students' argumentative writing among different learning styles?
4. Is there any interaction between mind mapping and gender differences on the average score of the students' idea development in argumentative writing?
5. Is there any interaction between mind mapping and learning styles on the average score of the students' idea development in argumentative writing?

## **B. Research Methodology**

### **1. Subjects**

The subjects of this study were the seventh semester students of English department of State College for Islamic Studies (STAIN) at Kediri who had passed writing course series (writing 1, 2, and 3) and were registered in TOEFL class. Two classes of TOEFL class were selected randomly by lottery to group 1: taught by standard linear notes (41 students) and group 2: taught by mind mapping (41 students).

### **2. Design**

This study adopts experimental design with the posttest-only design with non equivalent groups. As a consequence of using intact group, the initial differences between two groups can contribute to the final outcome and serve as rival hypotheses explaining the outcome. Hence, to control such initial differences, the subjects' English proficiency score were used as a control variable. The statistical control will be applied to equate the two groups. Eventually, the scores obtained by both of the groups from the writing test are compared after they have been adjusted for any differences that may exist on their TOEFL score using analysis of covariance (ANCOVA).

### **3. Instruments**

This study applied a standard test of TOEFL-like test, a writing test and a scoring guide for writing test, and a learning styles' questionnaire. The standard test was used to identify the participants' English language proficiency. The writing test was used to explore the students' idea development in argumentative writing, and the scoring guide is used to evaluate the students' idea development in their argumentative writing.

### **4. TOEFL test**

The TOEFL scores of the subjects were used to control the initial difference as the consequence of using intact groups. All of the subjects had participated in the test which is held in the beginning of September, 2012, conducted by the official staff of State College for Islamic Studies (STAIN) Kediri.

### **5. Writing Test**

The purpose of the writing test is to evaluate the students' idea development in argumentative writing. The writing prompts in this study is adopted the TOEFL test.

The prompt required test takers to choose and defend a position on an issue. Next, the test only provided one topic to be addressed by the subjects of this study as a consideration to provide the reliability of the test itself. The writing test had been validated to the expert and tried out to the similar potential students.

## 6. Scoring Guide

To score the students' compositions, this study employed a Primary Trait Scoring Guide (PTSG). The PTSG technique is selected from a number of options available such as holistic and analytic scoring since this scoring technique is the most appropriate one to be used in this study. Moreover, this scoring technique has been shown make it possible to train raters in a relatively limited time. Scoring guide utilized in this study adopted a 4-point scale designed by Latief (1990).

**Table 1 Primary Trait Scoring Guide (PTSG)**

Score	Criteria
0	The writer didn't state his/her claim
1	The writer takes a position on the issue but doesn't provide relevant evidence that strongly supports the writer's position
2	The writer takes a position on the issue and provides one piece of relevant evidence that strongly supports the writer's position
3	The writer takes a position on the issue and provides two pieces of relevant evidence that both strongly supports the writer's position
4	The writer takes a position on the issue and provides three or four pieces of relevant evidence that all strongly supports the writer's position

Adopted from (Latief, 1990)

## 7. Training Procedure

During the training, there were no differences in the treatment between the two groups except in brainstorming ideas in which the first group was introduced mind mapping as a strategy while the second group did brainstorming ideas using linear notes. The material or topic given as a model between two groups is same.

**Table 2 The Treatment Procedure**

Meeting	Experimental Group	Control Group
1	Rhetorical Focus of Writing in TOEFL	Rhetorical Focus of Writing in TOEFL
2	Brainstorming ideas using Mind Mapping → Outlining	Brainstorming ideas using Linear Notes → Outlining
3	<ul style="list-style-type: none"> <li>Having feedback from the teacher</li> <li>Revising and writing</li> </ul>	<ul style="list-style-type: none"> <li>Having feedback from the teacher</li> <li>Revising and writing</li> </ul>
4	Brainstorming ideas using Mind Mapping → Outlining	Brainstorming ideas using Linear Notes → Outlining
5	<ul style="list-style-type: none"> <li>Having feedback from the teacher</li> <li>Revising and writing</li> </ul>	<ul style="list-style-type: none"> <li>Having feedback from the teacher</li> <li>Revising and writing</li> </ul>
6	POST-TEST	POST-TEST

## 8. Data Collection

To obtain the data needed, the collection of data is managed twice. First, the students are asked to sit on the TOEFL test administered by the official staff of

English Study Program of STAIN Kediri. The results of the TOEFL test are used to measure the students' English proficiency and the scores obtained are used as a control variable in the statistical calculation. Next, the students were asked to do the writing test which was administered after finishing the treatment procedure. Then two raters were involved to score the students' essay. To estimate the reliability between the score of the two raters, two measures of inter-rater reliability are performed. The first measure utilized is Pearson Product Moment Correlation between first and second raters. The second measure employed is coefficient alpha which provides an estimate of the internal consistency of the final scores based upon two raters per essay.

### C. Findings

To test our hypothesis, we began by conducting descriptive analysis to examine the distributional properties of the data and to determine the equivalency of the treatment and control groups prior to further analysis. In analyzing the data, the writing scores obtained by two groups are analyzed using the analysis of covariance (ANCOVA) with the TOEFL scores as the covariate. The data of this study was computed by a means of SPSS 16.0 for Windows.

As a consequence of involving two raters for scoring, the measurement of inter-rater reliability is performed. The result of the correlation of the scores of the two raters and the coefficient alpha can be seen in the Table 3 and Table 4 respectively.

**Table 3 Correlations Pearson Product Moment**

		RATER_1	RATER_2
RATER_1	Pearson Correlation	1	.861**
	Sig. (2-tailed)		.000
	N	82	82
RATER_2	Pearson Correlation	.861**	1
	Sig. (2-tailed)	.000	
	N	82	82

\*\*, Correlation is significant at the 0.01 level (2-tailed).

Table 4 reports that the reliability coefficient is 0.861, which indicates a high level of consistency between first and second raters.

**Table 4 Reliability Statistics Coefficient Alpha**

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	on N of Items
.891	.891	31

Table 4 shows that the reliability coefficient is 0.891, which indicates a high level of the internal consistency of the final scores based upon two raters per essay.

In light of the result of computation of the reliability indicates that the data had a high reliability, we then used the analysis of covariance (ANCOVA), a general linear model, to examine the impact of the treatment. We entered the corresponding TOEFL score as a covariate on each of the outcome measures to control for any differences between the treatment and the students' writing test score.

Before conducting an ANCOVA, we first test the assumptions underlying it. There are five assumptions to be met for calculation. They are the assumption of independence, the assumption of normality, the assumption of the homogeneity of regression, the assumption of homogeneity variances, and the assumption of a linier relationship between covariates and the dependent variable.

### 1. Test of Independence

In this present study the students in both experimental and control group were not told that they become a subject of the research. Moreover, during the treatment the students in both groups are not allowed to take their assignment home. Allowing the students to take their assignment home would invite some unplanned events occurred. Furthermore, the two groups did the posttest in the same day and time, it ensure that the students in both groups do the test independently. Therefore, the first assumption was fulfilled.

### 2. Test of Normality

The second assumption was that the error variances needs to be normally distributed, which can be checked with one-sample kolmogorov-smirnov test. The error variances will be normally distributes if the value of  $p > \alpha$ . The result of computation can be seen in Table 5.

**Table 5 One-Sample Kolmogorov-Smirnov Test**

		Residual for writing
N		82
Normal Parameters <sup>a</sup>	Mean	.0000
	Std. Deviation	.97200
Most Extreme Differences	Absolute	.127
	Positive	.068
	Negative	-.127
Kolmogorov-Smirnov Z		1.153
Asymp. Sig. (2-tailed)		.140

a. Test distribution is Normal.

From the above output, we could see that the underlying assumption of normality for ANCOVA was fulfilled, as evidenced by  $p (.140) > \alpha (.05)$ .

### 3. Test of homogeneity of variances

In addition to testing the assumption of independence and the assumption of normality we need to conduct a test of homogeneity of variances. In this present study,

to confirm the assumption of homogeneity of variance Levene's test for equality of variances is utilized. If the Levene test is positive ( $p < 0.05$ ) then the variances in the groups are different (the groups are not homogeneous), and therefore the statistical assumption is not met. The assumption is fulfilled if the Levene test result is ( $p > 0.05$ ). The test result of homogeneity variances made by Levene test is presented in Table 6.

**Table 6 Levene's Test of Equality of Error Variances<sup>a</sup>**

F	df1	df2	Sig.
1.604	11	70	.117

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + toefl + strategy + gender + l.style + strategy \* gender + strategy \* l.style + gender \* l.style + strategy \* gender \* l.style

From the above output – we see that the underlying assumption of homogeneity of variance has been met – as evidenced by  $F(11, 70) = 1.604$ ,  $p = .117$ . That was,  $p (.117) > \alpha (.05)$ .

From the result of testing normality and homogeneity variances, all of the assumptions are fulfilled. Based on these findings, we can proceed analyze the data using parametric test.

#### 4. Test of Homogeneity of Regression (slope)

Prior to the ANCOVA test, testing for homogeneity of regression (slope) must be performed. The test evaluates the interaction between the covariate and the independent variable in the prediction of the dependent variable. To be able to proceed with ANCOVA analysis, there must be no interaction between the covariate and the independent variable ( $p > 0.05$ ). A significant interaction between the covariate and the independent variable suggests that the differences on the dependent variable among groups vary as a function of the covariate. If the interaction is significant – the results from an ANCOVA are not meaningful– and ANCOVA should not be conducted. The result of test of homogeneity of regression (slope) is presented in Table 7.

**Table 7 Tests of Homogeneity Regression (slope)**

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	18.472 <sup>a</sup>	5	3.694	3.814	.004
Intercept	2.698	1	2.698	2.785	.099
<b>strategy * toefl</b>	<b>1.148</b>	<b>1</b>	<b>1.148</b>	<b>1.185</b>	<b>.280</b>
<b>gender * toefl</b>	<b>2.294</b>	<b>1</b>	<b>2.294</b>	<b>2.368</b>	<b>.128</b>
<b>l.style * toefl</b>	<b>.798</b>	<b>2</b>	<b>.399</b>	<b>.412</b>	<b>.664</b>
Error	73.625	76	.969		
Total	704.000	82			
Corrected Total	92.098	81			



Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	18.472 <sup>a</sup>	5	3.694	3.814	.004
Intercept	2.698	1	2.698	2.785	.099
<b>strategy * toefl</b>	<b>1.148</b>	<b>1</b>	<b>1.148</b>	<b>1.185</b>	<b>.280</b>
<b>gender * toefl</b>	<b>2.294</b>	<b>1</b>	<b>2.294</b>	<b>2.368</b>	<b>.128</b>
<b>l.style * toefl</b>	<b>.798</b>	<b>2</b>	<b>.399</b>	<b>.412</b>	<b>.664</b>
Error	73.625	76	.969		
Total	704.000	82			

a. R Squared = .201 (Adjusted R Squared = .148)

In this present study, there are three independent variables namely writing strategy, gender differences, and learning styles. The interaction sources in the result of computation are labeled strategy\*toefl, gender \* toefl, and l.style \* toefl. Our results suggest the interactions are not significant among those three independent variables namely writing strategy, gender differences, and learning styles with the covariate as evidenced by  $F(1,76) = 1.185$ ,  $p(.280) > \alpha(.05)$ ;  $F(1,76) = 2.368$ ,  $p(.128) > \alpha(.05)$ ;  $F(1,76) = .412$ ,  $p(.664) > \alpha(.05)$ , respectively. Based on this finding, we can proceed with our ANCOVA analysis.

### 5. Test of a Linear Relationship between the Covariate and the Dependent Variable

The covariate is included in the analysis to control for the differences on the independent variable. The primary purpose of the test of the covariate is to evaluate the relationship between the covariate and the dependent variable, controlling for the independent variable (for any particular group). To be able to proceed with ANCOVA analysis, there must be a significant relationship between the covariate and the dependent variable ( $p < 0.05$ ). The result of test of a linear relationship between covariate and the dependent variable is presented in Table 8.

**Table 3.9 Tests of Linear Relationship between the Covariate and the Dependent Variable**

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	26.144 <sup>a</sup>	12	2.179	2.279	.017
Intercept	4.133	1	4.133	4.324	.041
<b>Toefl</b>	<b>15.775</b>	<b>1</b>	<b>15.775</b>	<b>16.504</b>	<b>.000</b>
Strategy	2.454	1	2.454	2.567	.114
Gender	1.092	1	1.092	1.142	.289
l.style	1.003	2	.502	.525	.594
strategy * gender	1.995	1	1.995	2.087	.153
strategy * l.style	.093	2	.047	.049	.952

gender * l.style	2.683	2	1.342	1.404	.253
strategy * gender * l.style	4.223	2	2.112	2.209	.118
Error	65.953	69	.956		
Total	704.000	82			
Corrected Total	92.098	81			

a. R Squared = ,284 (Adjusted R Squared = ,159)

In the current study, this relationship is significant,  $F(1, 69) = 16.504$ ,  $p < .05$ . It means that there is a relationship between the covariate and the dependent variable. Had this not been significant, the question then would be on the appropriateness of the selection of the covariate. Based on this finding, it can be concluded that the covariate is linearly related to the dependent variable then the assumption is met.

#### D. The Result of Analysis Using ANCOVA

From the result of the testing of assumptions for ANCOVA, all of the assumptions are met for the calculation. Based on this finding, we can proceed with ANCOVA analysis.

In this present study we first address the questions to ferret out the main effect of mind mapping, gender differences, and the students' learning styles on the students' idea development in argumentative writing. Second, we examine the interaction effects between those independent variables on the students' idea development in writing.

To answer the questions formulated in this study, we verify the hypothesis of this research one-by-one using a-three-way ANCOVA. The result of the computation can be seen in Table 9.

**Table 9 Tests of Between-Subjects Effects**

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	26.144 <sup>a</sup>	12	2.179	2.279	.017
Intercept	4.133	1	4.133	4.324	.041
Toefl	15.775	1	15.775	16.504	.000
<b>Strategy</b>	<b>2.454</b>	<b>1</b>	<b>2.454</b>	<b>2.567</b>	<b>.114</b>
<b>Gender</b>	<b>1.092</b>	<b>1</b>	<b>1.092</b>	<b>1.142</b>	<b>.289</b>
<b>l.style</b>	<b>1.003</b>	<b>2</b>	<b>.502</b>	<b>.525</b>	<b>.594</b>
<b>strategy * gender</b>	<b>1.995</b>	<b>1</b>	<b>1.995</b>	<b>2.087</b>	<b>.153</b>
<b>strategy * l.style</b>	<b>.093</b>	<b>2</b>	<b>.047</b>	<b>.049</b>	<b>.952</b>
<b>gender * l.style</b>	<b>2.683</b>	<b>2</b>	<b>1.342</b>	<b>1.404</b>	<b>.253</b>
strategy * gender * l.style	4.223	2	2.112	2.209	.118
Error	65.953	69	.956		
Total	704.000	82			
Corrected Total	92.098	81			

a. R Squared = ,284 (Adjusted R Squared = ,159)

### 1. Hypothesis Testing 1

The first hypothesis to be tested is the main effect of mind mapping by testing the statistical hypothesis as follows.

Ho : There is no significant difference on the mean score of the idea development of students' composition between those using mind mapping and those using linear notes.

To evaluate the null hypothesis, the group source as labeled strategy in Table 9 is used. From the above output, the  $p$ -value is .144. The result reveals that strategy value is  $F(1, 69) = 2.567, p (.114) > \alpha (.05)$ . The result of the analysis indicates that the  $p$ -value turns out to be higher than that of the .05 level of significance. It means that we do not have enough evidence to reject the null hypothesis.

As the null hypothesis could not be rejected, it means that statistically there is no significant main effect for writing strategy, showing that the idea development of the students who use mind mapping and the students who use linear notes in writing are equal when controlling for their English proficiency scores. The interpretation of this finding is having mind mapping as a strategy in brainstorming ideas does not make the quality of idea development in students' writing better than the quality of idea development in writing by having linear notes as a strategy in brainstorming ideas.

### 2. Hypothesis Testing 2

The second hypothesis to be tested is the main effect of gender differences by testing the statistical hypothesis as follows.

Ho : There is no significant difference on the mean score of the idea development of students' composition between female and male students.

To evaluate the null hypothesis, the group source as labeled gender in Table 9 is used. From the above output, the  $p$ -value is .289. The result shows that gender value is  $F(1, 69) = 1.142, p (.289) > \alpha (.05)$ . The result of the analysis indicates that the  $p$ -value turns out to be higher than that of the .05 level of significance. It means that we do not have enough evidence to reject the null hypothesis.

As the null hypothesis could not be rejected, it means that statistically there is no significant main effect for gender differences, with English proficiency scores as covariates. The interpretation of this finding is that the quality of the idea development of female students and male students are equal. The idea development in writing of female students is not better than the quality of idea development in writing of male students.

### 3. Hypothesis Testing 3

The next hypothesis to be tested is the main effect of learning style by testing the statistical hypothesis as follows.

Ho : There are not any significant differences on the mean score of the idea development of students' composition among different learning styles.

To evaluate the null hypothesis, the group source as labeled *Learning style* in Table 9 is used. From the above output, the  $p$ -value is .594. The result reveals that strategy value is  $F(2, 69) = .525, p (.594) > \alpha (.05)$ . The result of the analysis indicates that the  $p$ -value

turns out to be higher than that of the .05 level of significance. It means that we do not have enough evidence to reject the null hypothesis.

As the null hypothesis could not be rejected, it means that statistically there is no significant main effect for learning styles, with English proficiency scores as covariates, showing that the idea development of the students who are visual, auditory, and kinesthetic are equal. The interpretation of this finding is the differences of learning style having by students do not make the distinctive quality of idea development in writing among them.

#### 4. Hypothesis Testing 4

The next hypothesis to be tested is the interaction effect between mind mapping and gender differences by testing the statistical hypothesis as follows.

Ho : There is not any interaction between mind mapping and gender differences on the students' idea development in writing.

To evaluate the null hypothesis, the group source as labeled *strategy \* gender* in Table 9 is used. From the above output, the  $p$ -value is .153. The result reveals that strategy value is  $F(1, 69) = .2087, p (.153) > \alpha (.05)$ . The result of the analysis indicates that the  $p$ -value turns out to be higher than that of the .05 level of significance. It means that we do not have enough evidence to reject the null hypothesis.

As the null hypothesis could not be rejected, it means that statistically there is no significant interaction effect between mind mapping and gender differences, with English proficiency scores as covariates. The absence of interaction gives further interpretation that it is reasonable to believe that the difference in mean score between the idea development in writing of male students and that of female students is equal for all writing strategy namely mind mapping and linear notes.

#### 5. Hypothesis Testing 5

The next hypothesis to be tested is the interaction effect between mind mapping and learning styles by testing the statistical hypothesis as follows.

Ho : There is not any interaction between mind mapping and learning styles on the students' idea development in writing.

To evaluate the null hypothesis, the group source as labeled *strategy \* l.style* in Table 9 is used. From the above output, the  $p$ -value is .952. The result reveals that strategy value is  $F(2, 69) = .049, p (.952) > \alpha (.05)$ . The result of the analysis indicates that the  $p$ -value turns out to be higher than that of the .05 level of significance. It means that we do not have enough evidence to reject the null hypothesis.

As the null hypothesis could not be rejected, it means that statistically there is no significant interaction effect between mind mapping and learning styles, with English proficiency scores as covariates. The absence of interaction gives further interpretation that it is reasonable to believe that the difference in mean score among students having visual, auditory, or kinesthetic learning style is equal for all writing strategy namely mind mapping and linear notes.

#### E. Discussion

In the context of English as a Foreign Language (EFL), it has been widely claimed by most Indonesian learners across different levels of education that writing is

a difficult skill to be learned. Hence it is not surprising that a lot of studies have investigated efforts to help the learners develop their writing skill. This present study is mainly focus on seeking out the appropriate strategy in prewriting or planning stage in writing process.

The experts of SLA are acutely aware of that planning is an inseparable part of spoken and written language use since all speakers and writers need to decide what to say and write and how to do it (Ellis, 2005). For SLA researchers, planning serves as one of studying what students attend to and what effect it has on the way they use language. Its significance for language teachers lies in the fact that planning is a relatively straightforward way of influencing the kind of language that learners produce. Hence, this study was conducted to contribute the growing body of literature on second language acquisition, specifically how a writing strategy in planning impact English writing, when it is a foreign language.

Mind mapping as a visual representation of ideas used as a strategy in generating ideas, claimed by Buzan & Buzan (1993), has over benefits of linear notes. Mind mapping is believed to be able to extract our ideas from our head into something visible and structured, using associations, connections and triggers to stimulate further ideas. It is so as the spatial layout of Mind mapping helps us gain a better overview and makes new connections more visible so we can create an infinite number of thoughts, ideas, link, and association on any topic. For this reason, mind mapping is claimed enable us to generate new ideas in brainstorming sessions.

In this present study the experiment was conducted to verify the theory whether mind mapping is more effective to improve the students' idea development than linear notes in writing. The result of this study yields that the students who received mind mapping didn't demonstrate higher quality in their idea development, after taking into account their English proficiency test score, than their counterpart who received no treatment (linear notes). The finding of this study, therefore, doesn't support the Buzan's claim that mind mapping outperformed the linear notes.

No study is without limitations. This study is no exception. The result findings which is not confirm the hypothesis that students who use mind mapping before writing have get better idea development in their writing compare to students who use linear notes may also have several noteworthy limitations.

This observation is not mean, by any means, to be attacked on the mind mapping foundation (incorporation) and services courses in particular. In fact, this conflicting finding may be caused by many possible causes. Possible explanations for the insignificant result findings may be found by considering the following variables: 1) the size of the sample, 2) the amount of instructional time devoted to the subjects of the study, 3) the instructional media used, 4) the quality of the instructor, and 5) the type of writing.

First, it can be argued that the small sample size may not have allowed confidence that the difference between the two groups was real. The relatively low number of participants limited the ability to generalize the result findings of this study; therefore, the findings should be interpreted with caution. Although this problem might have been partially offset by other researchers as several scholars have been agreed that in experimental procedure there is at least 15 participants in each group ((Dörnyei, 2007); meanwhile, this present study had more than 30 samples in each group (N

experimental=41 and N control=41). The sample size, however, is clearly an issue that we should intend to address in the future. *If possible, any replications could be carried out with a larger sample population so that the generalizability of the study can be increased.*

Secondly, the amount of instructional time devoted to experimental group is limited. The discovery that there was no significant difference in students' idea development in writing between the control group and the treatment group might only a short-effect due to a short period of training. The lack of difference between two groups may indicate that students need further training about mind mapping. Due to the tight teaching schedule, students had relatively limited opportunities to practice Mind Mapping skills before incorporating them into their writing. As we should follow the syllabus used in the institution, we must share the equal time in one semester to four topics covered in this course namely grammar, listening, reading, and writing in TOEFL. Therefore, this observation took writing time in which only had 6 meetings to implement it. In 5 meetings, the students were exposed to be trained using mind mapping in doing brainstorming ideas for 2 topics only. The twice experiences to employ mind mapping might not adequate to make any significant differences in the students' idea development in writing. The students might need more time to familiarize themselves with the concepts of mind mapping and apply the skills to be their habit for planning. Again, caution must be taken as the findings were yielded from a short-term observation. *Therefore, the future research needs to be conducted over a longer period of time if a more objective conclusion is to be made.*

Third, the instructional media used for training mind mapping may be factors contributing to the insignificant result. The studies conducted by Al-Jafr (2009) and Holland, Holland, & Davies (2003) found that Mind mapping software is a useful technique for helping students to generate, visualize, and organize ideas, and consequently, improving the quality of their writing. Meanwhile this present study utilized a paper-pen mind mapping as a strategy. Using mind mapping software has so much different from using a paper-pen only. By utilizing mind mapping software, the students will not face the problem regarding to the mind mapping law of curve lines, colors, even pictures. By using mind mapping software, the students can easily copy, adapt, and add by only give "a click" to their mouse. In light of the result of my informal interview to the students when conducting one by one conference in the class, actually they like to be introduced to mind mapping as it is fun and interesting strategy, but they felt that it is time-consuming as they have to try to give the picture by drawing. Meanwhile, most of the students admit that they do not have a good skill in drawing and it makes them frustrated. By using mind mapping software, those problems will be eliminated. The positive attitude given by the students toward the implementation of mind mapping as a strategy in brainstorming ideas by confirming that it is fun and interesting, particularly heartening for continuously implement it. *Therefore, it is suggested that future training program provide mind mapping software to reach firmer conclusion of the effectiveness of mind mapping in improving the students writing ability.*

Fourth, in light of the quality of the instructor, this study might not have met the quality standard set by the mind mapping organization yet. The instructor that is the researcher herself is not a certified instructor from Mind Mapping Foundation. To be a certified instructor of mind mapping, anyone can join at ThinkBuzan Licensed Instructor Course. The latest update information, the licensed instructor course cost at

\$ 5280.00 that was held in Dubai at 11-14 March 2013 (Buzan, 2013). The course runs for 4 days from 9 a.m to 5 p.m. In this respect, the certified instructor to train for experimental group is needed if a more objective conclusion is to be made.

Fifth, this study focused only on idea development in an argumentative writing. The study conducted by Irwandi (2012) reported that mind mapping was able to overcome the students' problem regarding generating and organizing ideas in report texts which in turn improving the students' writing ability. Hence, replications are necessary with different types of writing and with different themes to see if Mind mapping could be applied in various types of writing and which type(s) of writing would benefit most from the use of this planning technique.

Those five variables are all possible explanations for the insignificant result observed, but they are only conjecture. There is clearly a need for further research in this area.

## F. Conclusion and Suggestions

By performing a three-way ANCOVA, with students' TOEFL score as covariate, the conclusions can be drawn as follows.

Concerning research question 1, the result finding indicates that there is no significant difference on the students' idea development in writing between groups, as evidenced by  $F(1, 69) = 2.567, p (.114) > \alpha (.05)$ , showing that the idea development of the students who use mind mapping and the students who use linier notes in writing are equal when controlling for their English proficiency scores. In accordance with research question 2, the result also indicates that there is no significant difference on the students' idea development in writing between gender differences,  $F(1, 69) = 1.142, p (.289) > \alpha (.05)$ , showing that the quality of the idea development of female students and male students are equal. In reference to research question 3, the result finding yields there is no significant difference on the students' idea development in writing among the students' learning styles,  $F(2, 69) = .525, p (.594) > \alpha (.05)$ , showing that the differences of learning style having by students do not make the distinctive quality of idea development in writing among them. With regard to research question 4, there is no significant interaction between treatment and gender differences  $F(1, 69) = .2087, p (.153) > \alpha (.05)$ , showing that the difference in mean score between the idea development in writing of male students and that of female students is equal for all strategy namely mind mapping and linear note. Concerning research question 5, the result also reveals that there is no significant interaction between treatment and learning styles,  $F(2, 69) = .049, p (.952) > \alpha (.05)$ , showing that the difference in mean score among students having visual, auditory, or kinesthetic learning style is equal for all strategy namely mind mapping and linear notes.

In light of the finding, some recommendations can be made to the writing teachers and the future researchers. For the writing teachers, the findings of the present study suggest some teaching practices. The teachers are suggested to consider mind mapping as an alternative strategy in brainstorming ideas to be implemented in their writing class as the students perceived mind mapping as a fun, interesting, and motivating approach. On the other hand, for some teachers whose students are coming from the low economic status, it is suggested not to force the students to use a mind

mapping as a strategy in brainstorming ideas. If the teacher would like to utilize the mind mapping software as the instructional media in classroom, it is suggested to consider their students' economy whether their students have the capability to purchase a laptop.

For the future researchers, the results of the study should also be complemented by further studies. Some recommendations are directed to the future researchers by considering the limitation of this study.

First, it was stated earlier that the subjects of the current study were only the seventh semester. In this connection, the study could be replicated with different levels of students, so that the effectiveness of Mind Mapping in writing could be further validated.

Second, this study only comparing two different writing strategy namely mind mapping and linear notes. With this regard, the study could be replicated with different strategies on the prewriting stage, e.g. clustering, concept mapping, etc. It may be another area that is worth investigating in relation to planning in writing. A comparative study of the effectiveness of different planning strategies in writing might further shed light on the issue.

Next, this study is only limited to ask the students to write an argumentative writing. Thus, replications are necessary with different types of writing and with different themes to see which type(s) of writing would benefit most from the use of this planning technique.

The last, in terms of the design, this study adopted an experimental design which lasted only for six meetings for the experiment. It is possible that the finding shows no significant difference with the other group because the length of the treatment is not enough. It is recommended that the study be replicated with longer time. As learning writing needs a relatively long time, it is also suggested that it remains to be established how students transfer the Mind Mapping into a structured and organized piece of writing by conducting case studies of the composing process of students for more in-depth observation and investigation.

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